

UNIVERSITI TEKNOLOGI MARA

**BIOLOGICAL ACTIVITIES OF FOUR
VARIETIES OF *Ficus deltoidea* (JACK)
AND CORRELATION TO THEIR
FLAVONOID CONTENT**

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Thesis submitted in fulfillment
of the requirements for the degree of
Master of Science

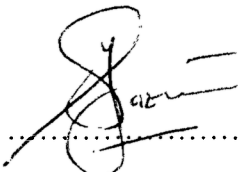
Faculty of Applied Sciences

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulation of Universiti Teknologi MARA. This thesis is original and it is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This topic has been not submitted to any other academic institution or non-academic institution for other degree or qualification.

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ABSTRACT

In this study, the aqueous leaves and figs extracts of four varieties of *Ficus deltoidea* (*Fd*) namely *Fdvk* (*kunstleri*), *Fdva* (*angustifolia*), *Fdvd* (*deltoidea*) and *Fdvi* (*intermedia*) were estimated for their total phenolic and total flavonoid contents, and evaluated for their *in vitro* antioxidant, α -glucosidase inhibitory and neuroprotective effects. Their flavonoid constituents and their correlation with their biological activities were also investigated. The TPC and TFC assays estimated that high content of total phenolics (89.10-99.60 mg GAE/g extract) for extracts of *Fdvd* and *Fdvi* but total flavonoids content was significantly higher in *Fdvd*. In the FTC antioxidant assay, the leaves and figs extracts of both *Fdvd* and *Fdvi* showed high percent of inhibition of more than 95% in the FTC assay and 73-79% in the TBA assay. The figs extracts of these two varieties (*Fdvd* and *Fdvi*) also exhibited strong radical scavenging activity in the DPPH assay, with IC_{50} of 7.8 μ g/ml. Interestingly, only the leaves extract of both varieties displayed higher inhibition towards α -glucosidase (*Fdvd* > *Fdvi* > *Fdvk* > *Fdva*) compared to the other two varieties and compared to the figs extract indicating the presence of more antidiabetic constituents in the leaves. In the neurotoxicity assay, all samples exhibited no signs of toxicity (> 50% cell viability) against SH-SY5Y neuroblastoma cell and displayed potential neuroprotective effects against H_2O_2 -induced toxicity cells. *Fdvd* and *Fdvi* (leaves and figs) showed good neuroprotective potential indicated by high percent of cell viability as determined by the MTS assay. Following chromatography of extracts on a reversed phase C_{18} column, LCMS Q-TOF identified the marker flavonoids of the plants from their m/z values as well as by comparison with internal standards. Employing the HCA technique, a dendrogram representing four clusters of flavonoids distribution in the eight samples (based on its distribution values) comprising epicatechin, quercetin-3-rutinoside, quercetin 5,4'-di-*O*-beta-*D*-glucopyranoside, myricetin and naringenin were successfully generated. A good correlation was observed between the flavonoid distributions in each plant variety to its biological activities. In conclusion, this study found that the strong activity of *Fdvd* and *Fdvi* could be correlated to the presence of the antioxidant epicatechin relatively high amounts in both varieties.

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